

SCOTT RIVER CORRIDOR HABITAT IMPROVEMENT PROJECT

LOCATED AT

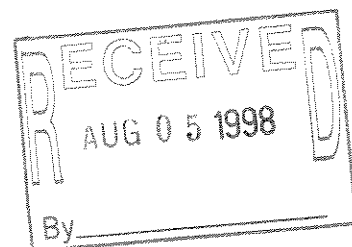
THE EILER RANCH

AGREEMENT # 14-48-0001-96672

PROJECT IDENTIFICATION # 96-JITW-02

Project completed by:
Siskiyou Resource Conservation District
Gary Black
PO box 268
Etna, CA 96027

Telephone # (530) 467-3975
Fax # (530) 467-5617



Abstract: The intent of the Scott River Corridor Habitat Improvement Project was to explore the effectiveness of different stream bank stabilization strategies. The Siskiyou RCD is actively seeking alternative methods of bank stabilization other than traditional rip rap. Although traditional rip rap reduces excessive bank erosion, the design does not consider direct fish habitat values. The RCD used the Eiler property to demonstrate different versions of bank stabilization, ranging from alternative rip rap styles to riparian planting techniques. Some techniques are derived from CDFG techniques while others are products from local research and development.

The RCD must provide stabilization success to property owners in order to continue the established rapport and cooperation. Therefore, more conservative or traditional techniques were used on rapidly eroding stream banks of the Scott River while newer methods were used on less severe erosion locations. In all instances, the RCD was not trying to channel or control the natural meander process. The active channel width of the Scott River throughout this location averages 450 feet and exceeds 700 feet (Scott River Riparian Inventory, A. Lewis) which is much (2-4 times) wider than historical assumptions. The likely cause of the wide, unstable channel is caused by a combination of excessive sediment contribution and lack of natural riparian regeneration. Natural propagation is limited by continuous bedload movement and stream bank erosion which prevents riparian establishment. The best stream side riparian zones along stream banks are where previous bank stabilization projects have occurred (rip rap). The stable bank provides a solid medium for riparian species to become established. A major goal of this project was to find cheaper, less intrusive techniques to stabilize banks and encourage natural riparian regeneration.

Background:

The Siskiyou Resource Conservation District (RCD) is a special district ran by a board of property owners who are addressing the issues related to resource use within the Scott River Watershed. The RCD has focused mainly on the floor of Scott Valley which has been dominated by agricultural use for over a century. Agriculture within Scott Valley focuses on beef cattle, wheat and alfalfa production. The Siskiyou RCD searches for project designs which conserve the use of resources as well as improve management of property. Projects which focus on protecting/enhancing fish or wildlife habitat yet have agricultural management benefits are more likely to be managed by property owners which extends and enhances the project life.

The current issue related to resource use revolves around anadromous fisheries and watershed health. It is generally accepted that the population of anadromous fisheries has generally declined throughout the Pacific Northwest during the past several decades. Academia has found that water quality is one of the limiting factors related to declining salmonid populations. The North Coast Regional Water Quality Control Board (NCRWQCB) has listed the Scott River as having two non-point source water quality impairments: excessive sediment and temperature levels at certain periods of the year (NCRWQCB determination, 1995). Within the agricultural portion of the Scott River watershed, excessive temperatures and sediment can be reduced by restoring and

enhancing the main stem and tributaries. NRCS estimated that 10%-15% percent of the sediment in the watershed is created by channel erosion within the floor of Scott Valley. Although this percentage is not significant, a healthy watershed can improve sediment dynamics by either trapping excessive sediment or improving channel geometry to increase sediment transport and reduce water temperatures.

Stream restoration projects within the floor of Scott Valley include riparian fencing, bank stabilization, implementation of fishery habitat improvement structures and replanting the riparian zone. The focus of the practices used on the Scott River and its tributaries is to reduce high sediment levels and water temperatures.

Eiler Project:

The Eiler project got its name from the property owners, Eiler and Son Farms. Eiler and Son Farms is ran by Bob and Bill Eiler. The property management has changed from raising livestock, to raising livestock and crops to the current practice of raising crops only. In the event that the Eilers choose to raise livestock, they have agreed to construct and implement riparian fencing. The Scott River enters the Eiler property at the Moffet Creek confluence and continues approximately 2.6 miles downstream. The focus of the project was to implement numerous styles of stream improvement techniques. The techniques and extent used on the Eiler property are described below:

Bank Stabilization: The RCD installed a total 870 feet of bank stabilization structures at three sites within the project scope. Bank stabilization techniques included the use of deflectors and bank armoring. This application was used on rapidly eroding banks where riparian techniques would erode before becoming established. Deflectors are rock jetties composed of large boulders and trees with root wads. 10 deflectors have been installed. The deflectors extend from the bank 12 to 15 feet into the stream. They are positioned perpendicular or slightly up stream.

Deflectors are constructed to serve two purposes: provide cover/complexity for fish and to "deflect" the velocity of the stream away from a rapidly eroding bank. Deflectors are placed on the outside of a meander where the thalweg (highest velocity portion of the stream) is closest to the bank. The velocities of the stream are reduced along the stream bank which allows vegetation to become established. The reduced velocities also deposit sand and silt which builds the bank and creates a flatter, more stable bank slope. Site #3 has gone through the flood of 1997 while sites #1, #2 and #3 have gone through the spring flood of 1998 (estimated to be a ten year event). No damage occurred and deposition and scour has occurred as predicted.

Riparian Planting: Three bank eroding treatments were originally to be used: willow baffles, willow mattresses and debris jams. The RCD had found that willow mattressing does not appear to work on the Scott River due to the hot arid summers and fluctuating water table. Willow mattresses dry out and die except for the extreme lowest toe of the mattress. Therefore, only willow baffles and debris jams were used on 1,350 feet of mildly eroding, unvegetated banks.

Willow baffles: Both rooted stock and pole cuttings were used as willow and cottonwood baffles. Baffles are willow or cottonwood cuttings which are trenched into the stream bank positioned in a wishbone fashion. As the willow and cottonwoods become established, they slow the flow of high water which causes silt to drop (trap sediment). Willow baffles can actually build the eroding banks, creating a channel which possess an improved width-depth ratio and better sediment transport. Some of the small rooted willow which were used as baffles eroded and were lost. The pole cuttings (which were buried at least 4 feet deep) remained but have been heavily pruned a beaver. Beaver pruning causes the tree to become bushy which is better for slowing erosive water velocities. Large cuttings is a technique which has merit as long as erosion is mild to moderate. The RCD will continue to monitor the baffle technique over the next several years.

Debris Jams: Two debris jam were used to absorb and deflect high flows along an eroding bank. The debris dams were constructed from large debris which were anchored with live pole cuttings exceeding six inches in diameter. The pole cuttings were buried more then eight feet deep in order to ensure a strong anchor during high flow. However, much of the secured large debris was removed during high flows of 1997. The live willow post anchors remained and worked much like the willow baffle technique, causing silt deposition rather then erosion.

Riparian Planting: Two and a half acres of rooted stock were planted on mid level bars and deposition areas. While three acres of pole cuttings were planted on higher elevation areas. Survival rates for the rooted stock was 68% after two seasons. We are reasonably pleased with the results considering the high flows during the past two winters. The rooted stock consists of the following species: Arroyo Willow, Red Willow, Black Cottonwood, Ponderosa Pine and alder. Growth after two summers ranges from only one foot of growth to over ten feet of growth, depending on soil type and other factors.

The pole cuttings were planted in February of 1998 so determination of their success is not possible. We have enjoyed over 90% survival rates with good growth (over three feet average) in similar areas and applications. Species of pole cuttings ranged from Golden Willow, Arroyo Willow, Red Willow and Black Cottonwood. The RCD has found that if this application works well, revegetation costs could be reduced by half.

Indian Creek: The lowest portion of Indian Creek has been down cutting for the past several years. As the stream down cut, the banks would cave in, creating a shallow, characterless stream. The RCD installed check dams which are commonly used by the NRCS. The check dams were constructed to extend two feet above existing channel height. During high flows the check dams act as a plunge to create a scour pool downstream as sediment fills in upstream. During the winter, the check dams filled in and the elevation of the channel bottom rose to the top of the check dams. The check dams created nice pools with white water for cover. Pole cuttings were planted along Indian Creek in order to provide some root structure to the recovering banks.

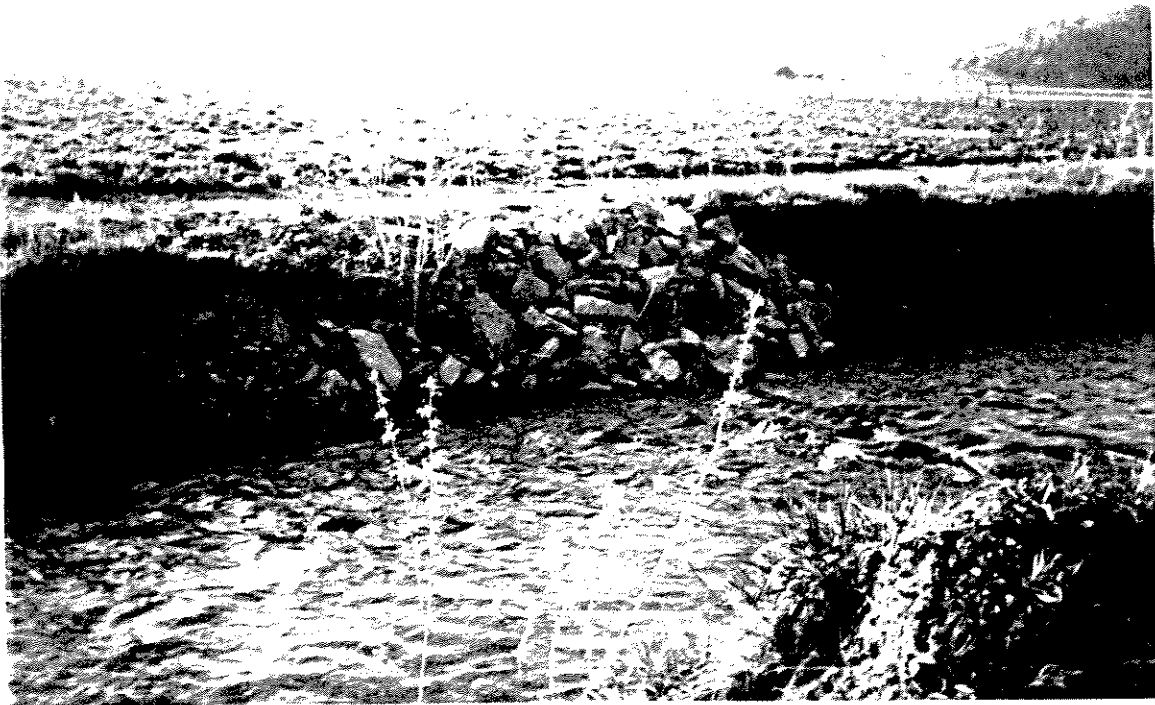
Employment: Employment opportunities provided by the project varied from tree planting to large equipment operation. The focus of the project channeled a significant percentage of the funding to materials and equipment use. However, the following and employment occurred in the project.

<u>Job</u>	<u>Duration</u>	<u>Training</u>
Planting & maintenance of rooted stock	3 positions for 3 months	Planting, irrigation, maintenance & protection of trees.
Planting of pole stock	4 positions for 4 days	Basic riparian ID, purpose & revegetation goal.
In-stream work	4 positions for 3 weeks	Construction of structures and applications other than riprap. One sub-contractor learned the use of deflectors and is using them instead of traditional riprap.

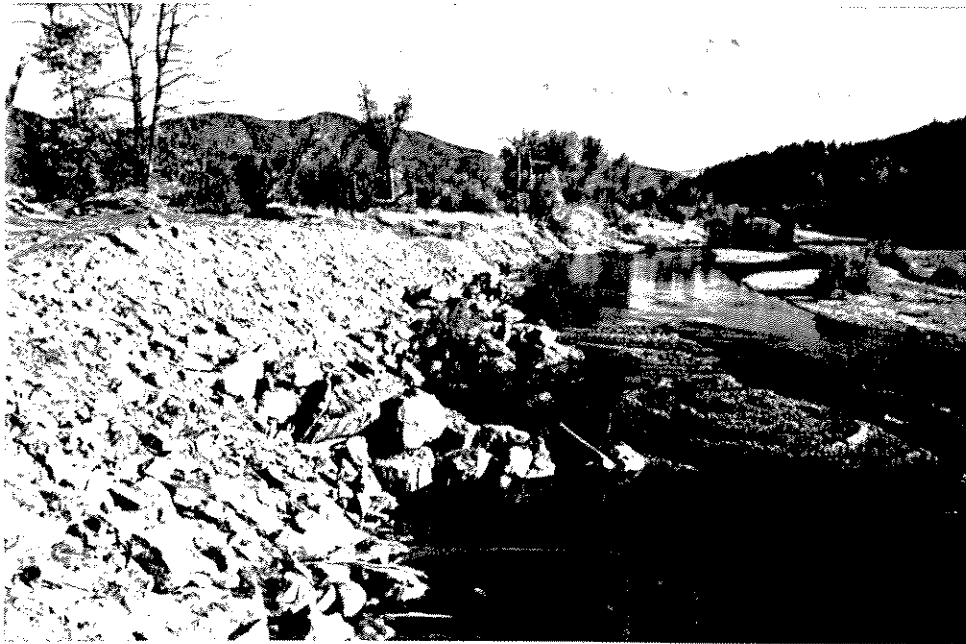
In summary, many approaches were used on the Eiler property. I was not pleased by our lack of success with debris jams. All other practices show promise and should be further explored. The project stabilized 870 feet of rapidly eroding banks with armoring and deflectors. A total five and one half acres have been planted with riparian trees (2.5 acres rooted stock, 3.0 acres pole cuttings). Over 1,300 feet of bank have been either planted with willow baffles or debris jams were installed to reduce mild erosion. Check dams were installed on Indian Creek to provide complexity and eliminate down cutting. The RCD is very pleased with the project and will continue to monitor the site for future applications.



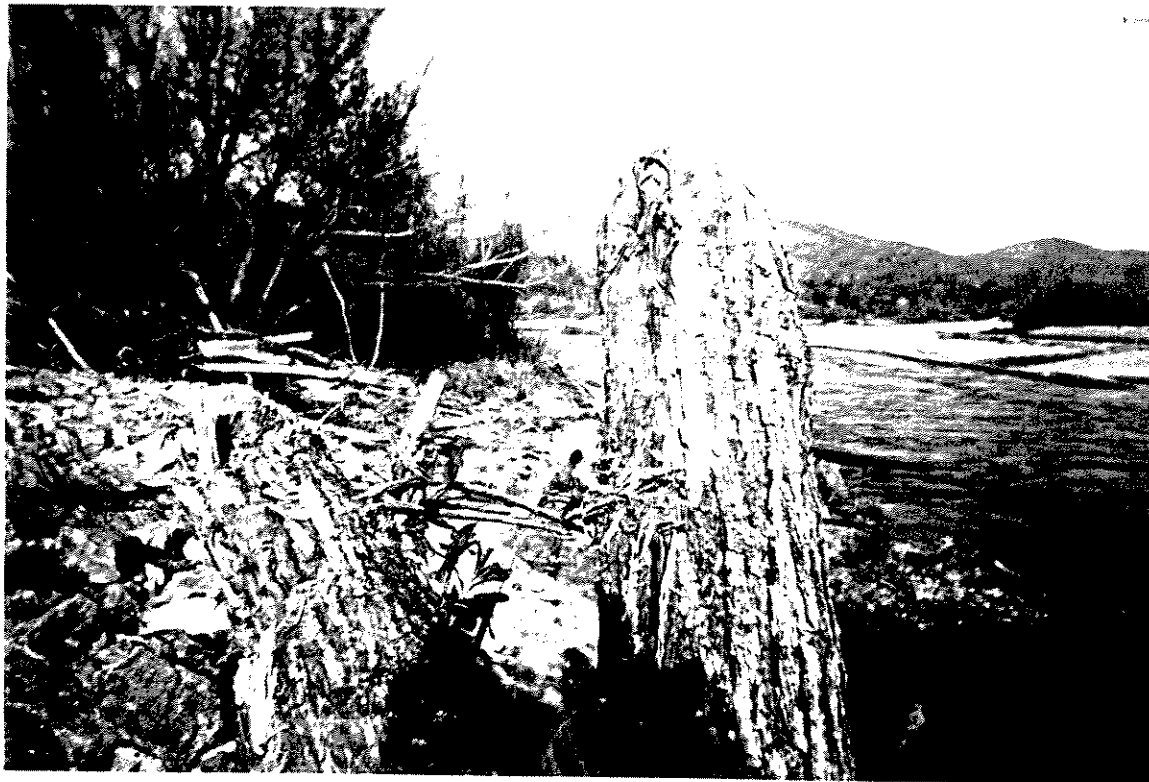
Willow baffles using pole cuttings. Beaver have harvested much of the cuttings which are beginning to emerge again.



Check Dam and cuttings on Indian Creek. Five check dams were installed along this portion of the creek



Site #3: Armoring and deflectors shown just after completion in September of 1996.



Live pole cutting used as debris jams anchor. Remains of second debris jam in background.



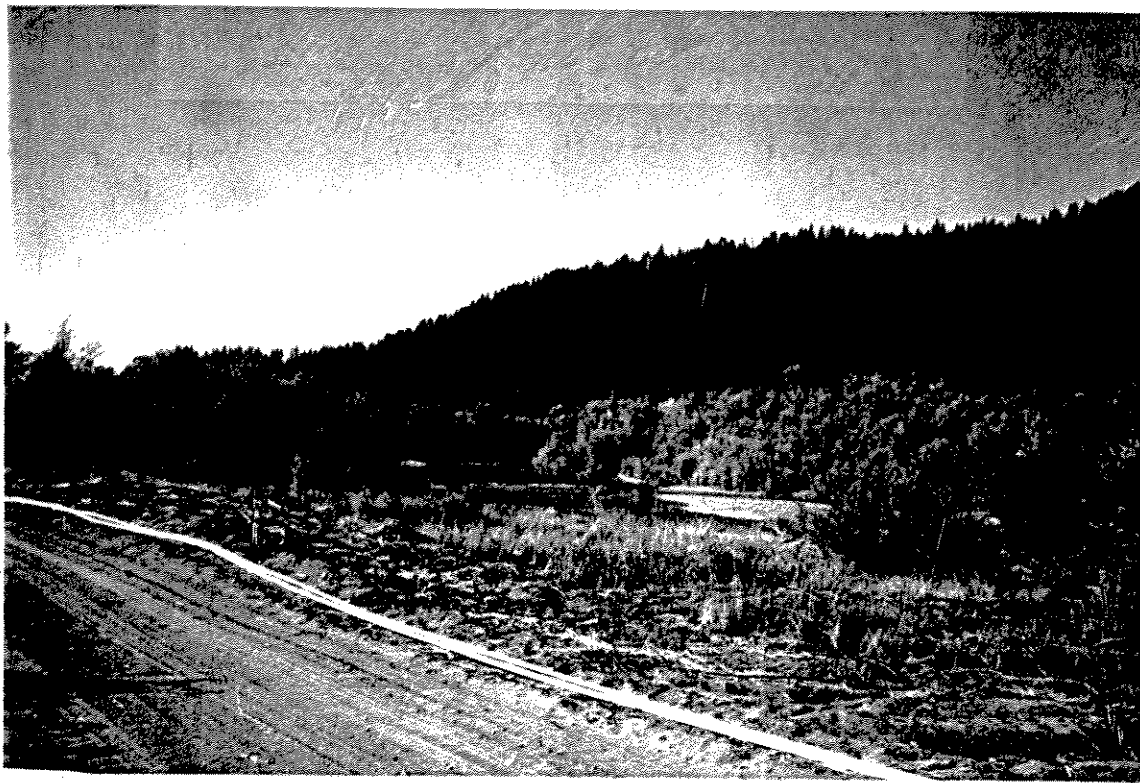
Drip Irrigation layout on Eiler property for small rooted stock. Photo taken in 1996



Pole plantings placed along river bank. Pole cuttings were installed in winter of 1998.

FINAL BUDGET
SCOTT RIVER HABITAT IMPROVEMENT
PROJECT ID# 96-JITW-02

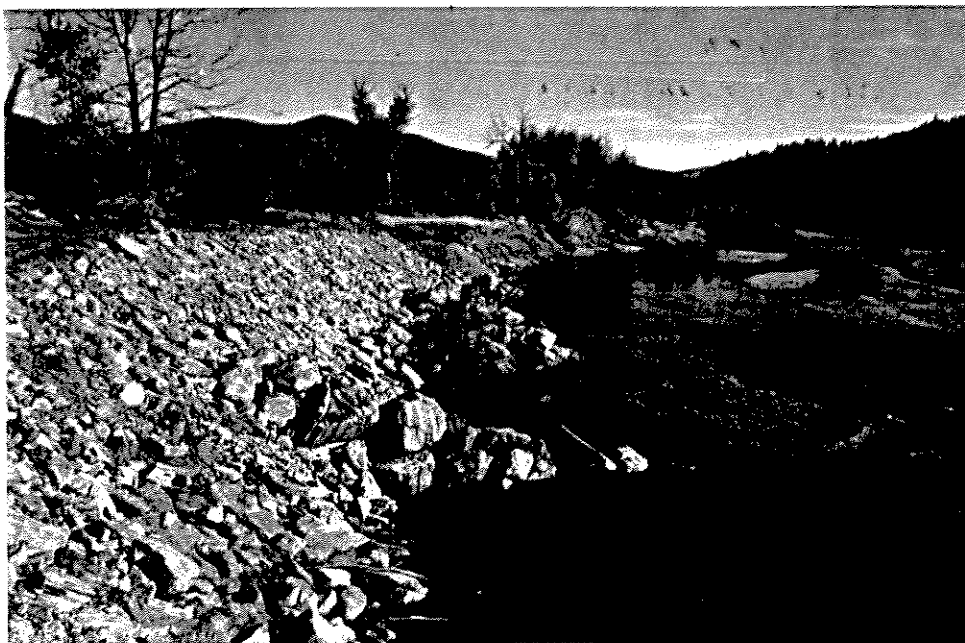
<u>Items</u>	<u>Budget</u>	<u>Budget Readjustment</u>	<u>Cost Share</u>	<u>Amount Remaining</u>
Salaries	\$ 2,300.00	\$ 2,832.32	\$ 0.00	\$ 0.00
Professional Services	\$ 3,970.00	\$ 2,981.32	\$ 400.00	\$ 0.00
Travel	\$ 500.00	\$ 145.10	\$ 0.00	\$ 0.00
Materials	\$22,000.00	\$21,972.10	\$2,000.00	\$ 0.00
Operations	\$22,700.00	\$23,589.08	\$ 800.00	\$ 0.00
Sub Total	\$51,470.00	\$51,470.00	\$3,200.00	\$ 0.00
Administration	\$ 5,147.00	\$ 5,147.00	\$ 0.00	\$ 0.00
Total	\$56,617.00	\$56,617.00	\$3,200.00	\$ 0.00



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